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Acoustic Array Observations of Seismic Events

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Hydrophone arrays may be used to observe continental and oceanic seismic events. Observed signals are of two types: acoustic waves which travel from source to receiver entirely in the SOFAR channel (T-phases), and converted seismic waves, which propagate primarily as elastic waves through the solid earth, but convert immediately beneath the array into vertically-traveling acoustic waves.

Long-range observations of T-phases might be used to identify acoustic blockage. Patterns of T-phase observations at the Nicolas Is. SOSUS arrays for ridge events along the East Pacific Rise and the Pacific-Antarctic ridge are consistent with known areas of blockage in the Tasman Sea and the Chatham Rise. Uncertainty in coupling mechanisms complicate the interpretation of blockage.

Hydrophone arrays in the vicinity of continents observe converted seismic waves from on-shore events. An estimate of detection range for events at regional distance is made for selected western U.S. events using several hydrophone arrays in the eastern Pacific. Vertical line arrays improve converted-wave signal-to-noise ratios by enabling vertical beamforming with nulls steered horizontally to suppress ambient noise.

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